TITLE

AIR HOSE REEL

CROSS-REFERENCE TO RELATED APPLICATION

This application is a continuation-in-part of the co-pending U.S. patent application serial no. 10/373,338 filed February 24, 2003.

BACKGROUND OF THE INVENTION

The present invention relates generally to air hose reels and, in particular, to a reel for storing and deploying an air hose to be connected between a source of pressured air and a pneumatic tool which reel can be mounted for use in a specific location and easily detached from its mounting bracket and used remotely.

Air hoses are well known and are typically utilized to connect a source of pressured air to various pneumatically powered tools such as paint atomizers, cutters, grinders, drills, screwdrivers, hammers, rivet guns, impact wrenches, ratchets, sanders and polishers, among others. Take-up reels for managing the use and storage of air hoses and electrical cords are well known. Such reels consist basically of a spool rotatably affixed to a structural component whereby the spool is manually or automatically rotated to wind an elongated hose or cord thereabout. Typically, such automatic reels employ a variety of spring and ratchet mechanisms for maintaining the hose/cord in the extended position and rewinding the hose/cord onto the spool when it is no longer needed. Such reels are particularly useful in industrial or commercial settings such as automobile repair shops, machine shops, carpentry shops and construction sites. These reels permit workers to readily access pressurized air as needed for the operation of portable pneumatic tools at various locations remote from an existing air compressor. In addition, the use of air hose reels makes it possible to provide only a short air fitting, such as a coupling or the like, on the various pneumatic tools thereby simplifying the movement and storage of the disconnected pneumatic tools.

While exterior designs may vary, retracting reels for electric cords and air hoses basically include a spool mounted on a shaft supported for rotation on a bracket or housing, and a cooperating ratchet and pawl to arrest the rotation of the spool when the air hose or electric cord has been paid out to a desired length, and a spring for rotating

the spool in a direction to rewind the air hose or electric cord when the ratchet and pawl are disengaged. Such electrical cord reels are shown, for example, in the United States Patent Numbers: 3,619,518; 3,715,526; 3,808,382; 4,726,538; and 6,273,354.

Various types of air hose reels are shown in the United States Patent Numbers: 4,759,560; 5,381,820; 5,666,992; and 5,732,733. These prior art reels disadvantageously do not provide a closed protective housing and satisfactory means for sealing the air pressure at the connections within the housing of the air reel.

It is desirable, therefore, to provide an air hose reel that overcomes the disadvantages of the prior art noted above. It remains desirable, therefore, to provide a cost-effective and functional air hose reel that provides a satisfactory means for enclosing the hose and sealing the air pressure at the connections within the housing of the air reel.

SUMMARY OF THE INVENTION

The present invention concerns an air hose reel for storing an air hose and connecting the air hose with a pressurized air supply. The air hose reel includes a hollow reel housing having first and second cup-shaped housing halves, each of the housing halves having a generally inverted U-shaped handle portion extending outwardly therefrom, the handle portions cooperating to form a handle for hand carrying the air hose reel. A generally U-shaped mounting bracket for attaching the air hose reel to a mounting surface is attached by a rod extending through apertures formed in the mounting bracket and apertures formed in at least one of the handle portions, the rod detachably attaching the housing to the mounting bracket. A nut releasably attaches to the rod and prevents removal of the rod from the mounting bracket apertures and the at least one handle portion apertures. A flange is mounted on an exterior of the second half of the housing, the flange including a first tubular portion extending outwardly from the reel housing and adapted to be connected to a source of pressured air, and a second tubular portion extending inside the reel housing and in fluid communication with the first tubular portion, the second tubular portion having an annular groove formed in an exterior surface and an O-ring retained in the groove.

A pulley is rotatably mounted inside the reel housing on an axis of rotation. A nozzle is mounted on the pulley, the nozzle having a tubular nozzle inlet receiving the second tubular portion, the O-ring sealing between the exterior surface of the second

tubular portion and an interior surface of the nozzle inlet, the nozzle having a nozzle outlet in fluid communication with the nozzle inlet, the nozzle outlet extending transverse to the axis of rotation. A reel hose is wound on the pulley, the reel hose having one end attached to the nozzle outlet by a hose clamp and an opposite end extending through the housing aperture. A shaft is mounted in the first half of the reel housing, the shaft rotatably supporting the pulley. A return spring is mounted in the pulley for automatically winding up the reel hose, the return spring having one end attached to the pulley and an opposite end attached to the shaft.

DESCRIPTION OF THE DRAWINGS

The above, as well as other advantages of the present invention, will become readily apparent to those skilled in the art from the following detailed description of a preferred embodiment when considered in the light of the accompanying drawings in which:

Fig. 1 is a perspective view of an air hose reel in accordance with the present invention;

Fig. 2 is right side elevation view of the air hose reel shown in Fig. 1;

Fig. 3 is a cross-sectional view of the air hose reel taken along line 3-3 in Fig. 2;

Fig. 4 is an exploded perspective view of the air hose reel shown in Fig. 1;

Fig. 5 is a perspective view of an alternate embodiment pulley half according to the present invention;

Fig. 6 is a perspective view of the nozzle plate shown in Fig. 5; and

Fig. 7 is a perspective view of the nozzle shown in Fig. 5.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to Figs. 1-4, an air hose reel in accordance with the present invention is indicated generally at **10**. The air hose reel **10** includes a hollow reel housing **12** formed from a pair of cup-shaped halves, a first or left half **14** and a second or right half **16**. The housing **12** includes an inverted U-shaped handle formed from a first or left handle portion **13** extending from a top surface of the housing first half **14** and a second or right handle portion **15** extending from a top surface of the housing second half **16**. As best seen in Fig. 4, an inner surface of the housing first half **14** has a plurality of detent members **18** formed

thereon and a mounting boss **20** extending upwardly from a center portion thereof. An outer surface of the housing second half **16** defines a recess **22** that receives a flange **24**. The flange **24** is attached to the outer surface of the housing second half **16** by a plurality of fasteners **25** (Fig. 2). The flange **24** includes a first tubular portion **26** extending outwardly therefrom and a second tubular portion **28** extending inwardly therefrom. The tubular portions **26** and **28** are coaxial and define an axis of rotation **29** (Fig. 3) discussed below. The first tubular portion **26** threadably connects to a threaded end of an air supply hose **31**. The air supply hose **31** is approximately three feet long and preferably is connected to a compressed air supply (not shown) such as an outlet of an air compressor, a compressed air receiver or the like. The first tubular portion **26** of the flange **24**, therefore, functions as an external air inlet for the air hose reel **10**.

An air hose nozzle **30** includes a tubular nozzle inlet **32** that receives the second tubular portion **28** that extends through a central aperture in the outer surface of the housing second half **16**. A tubular nozzle outlet **34** extends radially from an outer surface of the inlet **32** and is in fluid communication with the interior of the inlet. The second tubular portion **28** includes an annular groove **36** (Fig. 3) formed in the outer surface thereof for receiving and retaining an O-ring **38**. The O-ring **38** provides a rotating air seal between the outer surface of the second tubular portion **28** and the inner surface of the nozzle inlet **32**. A snap ring **40** is received in an annular groove **41** formed in the outer surface of a free end of the inlet **32** and the snap ring is trapped between the flange **24** and the housing second half **16** to secure the nozzle **30** to the housing **12**. The nozzle outlet **34** functions as an outlet for the pressured air provided to the hose reel **10** through the air supply hose **31**.

The air hose nozzle **30** also includes a radially extending flange **42** formed at an end of the nozzle inlet **32** opposite the groove **41**. The flange **42** is attached to a mounting boss **44** extending axially outwardly from an internal surface of a generally disk-shaped first pulley half **46**. The flange **42** is attached to the mounting boss **44** by a plurality of fasteners (not shown).

The first pulley half **46** includes a plurality of radially extending flanges **48** evenly spaced about a periphery of an outer edge of a first winding drum half **49**. The winding drum **49** outer wall has an aperture **50** formed therein extending from an inner edge to permit access to the nozzle outlet **34**. A second pulley half **52** has a second winding drum half **53** with a plurality of radially extending flanges **54** evenly spaced

about a periphery of an outer edge of the second drum half. The first pulley half **46** and the second pulley half **52**, when attached at the inner edges as shown in Fig. 3, form a pulley, indicated generally at **56**. A radially extending wall **57** of the second pulley half **52** includes a plurality of axially outwardly extending female bosses **58a** that mate with corresponding axially outwardly extending male bosses **58b** (Fig. 3) on a facing radially extending wall **59** of the first pulley half **46**. A tab **60** (Fig. 4) extends axially from the inner edge of the second winding drum half **53** to partially close the aperture **50**. The inner edges of the drum halves **49** and **53** interlock, as shown in Fig. 3, which assists in the attachment of the first pulley half **46** and the second pulley half **52**. A cover plate **62** is attached to the outer edge of the second winding drum half **53** opposite the wall **57**. The cover plate **62** and the wall **57** define a cavity **64** (Fig. 3) therebetween.

A pawl member **63** is rotatably mounted on a boss (not shown) or similar mounting location formed on an outer surface of the end plate **62**. An end of the pawl member **63** is attached to one end of a tension spring **65**. The other end of the tension spring member is attached to the outer surface of the end plate **62**. The pawl member **63** cooperates with the plurality of detent members **18** during rotation of the pulley **56** and the end plate **62**.

A generally cylindrical shaft **66** extends through a coiled return spring **67** that is retained in the cavity **64**. The shaft **66** includes a reduced diameter first end **68** with a pair of opposed flats **70** formed thereon and an opposed reduced diameter second end **72**. The first end **68** of the shaft member **66** fits into the mounting boss **20** of the housing first half **14** with the flats **70** cooperating with a correspondingly shaped central aperture of the mounting boss **20** for preventing rotation of the shaft member **66** with respect to the first half **14**. An inner end of the return spring **67** is attached to the larger diameter central portion of the shaft **66**. An outer end of the spring **67** is attached to the second winding drum half **52**. Thus, as the pulley **56** is rotated to unwind an air hose, the spring **67** will be wound up to automatically rewind the air hose.

As shown in Fig. 4, a reel hose **74** is attached at a first end **73** thereof to the nozzle outlet **34** by a hose clamp **76**. The reel hose **74** extends from the nozzle outlet **34** through the aperture **50** and into a space **78** between the flanges **48** and **54**. A second end **75** of the reel hose **74** extends through an aperture **80** formed in the housing first and second halves **14** and **16** respectively. The reel hose **74** is approximately twenty-five feet long

and the second end **75** is adapted to be attached to a pneumatic tool (not shown) or the like. The reel hose **74** includes a ball stop **82** attached thereto with a split insert **84** to aid in retaining the ball stop **82** on the hose **74**. The ball stop **82** and insert **84** are attached to a portion of the reel hose **74** external to the reel case **12** near the end **75**. The ball stop **82** has an exterior diameter larger than the aperture **80**. The ball stop **82** is operable to stop the accidental retraction of the second end **75** of the air hose **74** into the space **78** during operation of the air hose reel **10**, outlined in more detail below.

A generally U-shaped mounting bracket **86** has a pair of apertures **87** formed in opposed legs that are spaced to fit over the first and second handle portions **13** and **15**. A rod **88** extends through the apertures **87** and a pair of corresponding apertures **89** formed in the second handle portion **15** to releasably attach the mounting bracket **86** to the reel housing **12**. The rod **88** can be retained by a nut **90**, or similar fastening device. When the mounting bracket **86** is attached to a mounting surface (not shown) by any suitable means, the reel housing **12** can be rotated about a longitudinal axis of the rod **88**.

It can be appreciated that the air hose reel **10** is easy to assemble. The spring **67**, the shaft **66**, the pawl **63**, the end plate **62**, the pulley **56**, and the nozzle **30** are assembled as a pulley subassembly. The hose **74** is attached to the nozzle outlet **34** of the nozzle **30** by the hose clamp **76**, with the end **75** of the hose **74** extending through the aperture **50**. The first end **68** of the shaft member **66** is then mounted in the mounting boss **20**. The flange **24** is attached to the second half **16** of the reel housing **12** and the first half **14** and the second half **16** are joined with the end **75** of the hose extending through the aperture **80**. The air supply hose **31** is then attached to the first tubular portion **26** to complete the air hose reel **10**. The first half **14** and the second half **16** are preferably attached at respective circumferential surfaces thereof by a plurality of fasteners (not shown).

The assembled air hose reel **10** may be then mounted by the bracket **86** to any suitable mounting surface. The air hose reel **10** may also be advantageously detached from the mounting bracket **86** and carried to a job site utilizing the handle portions **13** and **15**.

There is shown in Fig. 5 an alternate embodiment first pulley half **100** that includes a radially extending flange **101** having a plurality of evenly spaced openings **102** formed therein. The flange **101** extends about a periphery of an outer edge of a first winding drum half **103**. The winding drum **103** outer wall has an aperture **104** formed therein extending from an inner edge to permit access to a nozzle outlet **105**. A second

pulley half (not shown) has a similar flange and winding drum half configuration to be attached to the first pulley half **100** and form a pulley as an alternative to the pulley **56** shown in Figs. 3 and 4.

An air hose nozzle plate **106** shown in Fig. 6 is similar to the nozzle **30** and includes a tubular nozzle inlet **107** that receives the second tubular portion **28** (Fig. 3) that extends through a central aperture in the outer surface of the housing second half **16**. The second tubular portion **28** includes the annular groove **36** (Fig. 3) formed in the outer surface thereof for receiving and retaining the O-ring **38**. The O-ring **38** provides a rotating air seal between the outer surface of the second tubular portion **28** and the inner surface of the nozzle inlet **107**. The snap ring **40** (Fig. 3) is received in an annular groove **108** formed in the outer surface of a free end of the inlet **107** and the snap ring is trapped between the flange **24** and the housing second half **16** to secure the nozzle plate **100** to the housing **12**. A tubular nozzle coupler **109** extends radially from an outer surface of the inlet **107** and is in fluid communication with the interior of the inlet. An annular groove **110** is formed in the outer surface of the coupler **109** for receiving and retaining an O-ring (not shown).

A nozzle tube **111** is shown in Fig. 7 and has a tubular body **112** with the nozzle outlet **105** extending radially therefrom and being in fluid communication with an interior of the body. The body **112** has a closed end **113** and an opposite open end that receives the coupler **109** in a sealing relationship. Thus, air entering the nozzle inlet **107** will flow through the coupler **109** and the body **112** to exit at the nozzle outlet **105**, which outlet functions as an outlet for the pressured air provided to the hose reel **10** through the air supply hose **31**. The nozzle plate **106** and the nozzle tube **111** function together as a nozzle in the same manner as the nozzle **30**.

The air hose nozzle plate **106** also includes a radially extending flange **114** formed at an end of the nozzle inlet **107** opposite the groove **108**. The flange **114** is attached to a mounting boss **115** (Fig. 5) extending axially outwardly from an internal surface of the first pulley half **100**. The flange **114** is attached to the mounting boss **44** by a plurality of fasteners (not shown). The closed end **113** of the nozzle tube **111** has a pair of spaced apart tabs **116** extending outwardly therefrom. As shown in Fig. 5, the tabs **116** cooperate with a wall **117** extending axially outwardly from the same internal surface of the first pulley half **100** as does the mounting boss **44**. The tabs **116** and the wall **117** prevent both rotational and axial movement of the nozzle tube **111** relative to the coupler **109**.

In accordance with the provisions of the patent statutes, the present invention has been described in what is considered to represent its preferred embodiment. However, it should be noted that the invention can be practiced otherwise than as specifically illustrated and described without departing from its spirit or scope.